Computer Aided Dispatch (CAD)

WORKING GROUP REPORT OF FINDINGS

CAD: Enhanced Computer-Aided Dispatch environment that provides Miami-Dade Police and Fire Rescue departments with the necessary information needed to more quickly and safely respond to citizens' needs

Miami-Dade County
Office of the Chief Information Officer
Report prepared

Miami-Dade County
Office of the Chief Information Officer
Report prepared September 2000

Computer Aided Dispatch (CAD)

CIO's Working Group Report of Findings

***CAD**: Enhanced Computer-Aided Dispatch environment that provides Miami-Dade Police and Fire Rescue departments with the necessary information needed to more quickly and safely respond to citizens' needs*

PREPARED BY THE MIAMI-DADE COUNTY
CAD WORKING GROUP

Vision:

To operate an enhanced computer-aided dispatch (CAD) environment that provides Miami-Dade Police and Fire Rescue Departments with the necessary information needed to more quickly and safely respond to citizens' need.

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Computer Aided Dispatch System

Executive Summary

The CAD Working Group was formed by the County's Chief Information Officer, Mr. B.R. Witt, in May 2000. The working group was tasked with the following goals:

Goals:

a. Identify the desired CAD improvements of each department

b. Determine costs, benefits, and feasibility of desired improvements

c. Identify approach to implement new functionality:
   - Modify and add functionality to existing system
   - Replace existing system with off-the-shelf product
   - A combination of the above processes

d. Identify budgetary impacts as well as funding alternatives and recommend a funding strategy

e. Based on functional and financial analysis, recommend the priority for implementing the improvements and recommend an implementation strategy.

The existing CAD system is the most critical Miami-Dade County system. The CAD system handles over 2,000,000 calls a year for emergency and non-emergency assistance from the Fire Rescue and Police Departments. The existing CAD system directly affects life-safety as well as the protection of property for the citizens of Miami-Dade County. The present system was developed in 1979 and went through a complete re-write in 1992. The current system is "not broken" and performs the tasks for which it was intended very well with virtually no downtime and generally performs with sub-second response time.

The existing system, however, is reaching the end of its useful life. Lack of future maintenance and support for layered software, in which the system was written, dictates that the process to replace the system must be started immediately. The CAD system's lack of modern functionality places dispatchers at a disadvantage in dispatching resources to the scenes of incidents.

Through its analysis and evaluation of current CAD systems, the CAD Working Group has come to the realization that modern CAD systems are not only the traditional baseline dispatching system, but have evolved into information delivery systems which assists resources being dispatched to the scenes of incidents. Modern Police and Fire Rescue Departments utilize CAD effectively to:

- Automate dispatching functions by assigning and dispatching units without human intervention.
- Dynamically allocate resources throughout coverage areas according to incidents in progress or based on historical probability and statistics which predict where an incident is bound to take place.
- Track vehicle movements via global positioning systems.
- Send site information and premise information to aid personnel in handling potentially dangerous situations.
- Reduce radio traffic by automating CAD queries, reports and updates.

The CAD Working Group recognizes that it is not a sound business approach to continue to enhance the existing system in the long run. Not only because the layered software may not be supported in the future but because technology is moving at a faster rate than we are able, with scarce resources, to keep up with.

It is due to the above mentioned reasons that the CAD Working Group recommends to the CIO that the County:

1. *Immediately Pursue Procurement of Fire/Police CAD with the goal of implementing the new system by 2004*
    - New CAD Software and Hardware
    - Automatic Vehicle Locator (AVL) fully integrated to CAD
    - Fire Rescue System Status Management
    - Customizations required to interface or integrate existing Miami-Dade County systems into the new CAD
    - Interface with County-Wide Answer Center
2. *Implement one fully integrated CAD system to handle 9-1-1 calls and dispatch functions for both Fire Rescue and Police Departments.*
3. *Immediately determine and commit to multi-year funding strategy for the acquisition of a new CAD. * (Note: These budgetary amounts include monies for Mobile Computing Units {MCUs})*

- FY 2000/01 $610,000
- FY 2001/02 $10m
- FY 2002/03 $4.39m

4. *Look at feasibility of amending the state statute related to the utilization of 9-1-1 fees, to include effective and efficient operations of a CAD center, which should allow for the purchase of a new CAD system and MCUs.*
5. *Implement CAD Improvements consistent with the following objectives:*
    - Implement new functionality on existing CAD to improve Fire Rescue response times in the short term (hard copy printouts at the stations).
    - Immediately begin development of CAD neutral enhancements, such as HAZMAT and premise history databases.
6. *Maintain the CAD Working Group as a Policy and Technical Support Committee*
7. *Look at the feasibility of acquiring a site to house a new communications center for Fire, Police and the Miami-Dade County Answer Center.*

Introduction to Computer Aided Dispatch

All 9-1-1 calls in Miami-Dade County are routed to the Miami-Dade Communications Center by the local telecommunications carriers, except for the cities of Miami, Miami Beach, Coral Gables, Hialeah, and Pinecrest, which are routed to their respective city Public Safety Answering Point (PSAP). Cellular originated calls are routed to the appropriate agency. The Communications Center is situated in the Regional Data Processing and Communications Building located at 5680 Southwest 87th Avenue. The building is shared with the Miami-Dade County Information Technology Department (ITD).

The Communications Center is a large command center jointly occupied and operated by the Police and Fire/Rescue Departments. Between eighteen and twenty MDPD Police Complaint Officers (PCO) provide all police and fire call taking functions during peak times. Each PCO uses a computer console designed to input incident information provided by the 9-1-1 callers. Each console position incorporates Enhanced 9-1-1, which provides the caller name and location. Calls are also received via 10-digit numbers. CAD incidents can also originate from officers in the field as "on view" or field initiated events. The call taker positions process more than two million calls annually.

Call information entered by the PCOs is routed to either police or fire dispatchers (or both) depending on the nature of the call. The system determines the correct dispatcher to whom to route the information based on the address. The dispatcher then assumes control of the incident and dispatches an appropriate resource. The Fire/Rescue CAD system recommends units to dispatch. Additional information may be added to the original incident information at any point during the course of the incident.

Most communication with the vehicles in the field is by voice; status messaging which sends data packets via the radio system is utilized for the following, by the Police Department:

0 09-Arrive Unit
1 56-Justice Building
2 56-South Dade Government Center
3 56-North Dade Government Center
4 To the Shop
5 To Station
6 Out of Service
7 09-Report Written
8 Change Records Channel
9 09-No Report

Inquiries from, and responses to, officers and firefighters for information stored by the respective departments and related public safety agencies in computer databases are done by voice radio transmissions. Often times in a non-emergency, but still potentially dangerous

situation, officers will wait upwards of 45 minutes to an hour for simple records checks on individuals. The workload of the dispatchers and traffic on the radio system is such that these requests cannot be expeditiously handled with the current system.

A major requirement of both departments is to provide officers and firefighters access, from their vehicles or stations, to information about hazardous materials, wanted persons, stolen vehicles, known dangerous addresses, and similar information, without making voice requests over the radio.

The present Computer Aided Dispatch system was developed by ITD in 1992 on COMPAQ VAX hardware. The system has since been modified and enhanced by ITD staff assigned to the Police and Fire/Rescue Departments.

Project History/Background

In July 1993, the County engaged KPMG Peat Marwick to assist both departments in developing an RFP for a CAD, Fire Records Management System and Mobile Computing Units for the Police Department. Peat Marwick and the County prepared a Request for Proposal (RFP) using requirements previously identified by the two Departments, coupled with Peat Marwick's experience with other similar departments, and after conducting comprehensive interviews throughout the County and allied agencies. Ultimately, the RFP was abandoned due to a lack of funding and commitment of IT resources for Y2K compliance.

This project is an outgrowth of an increasing need by both departments to more cost-effectively serve their clients, the citizens of Miami-Dade County. Although Miami-Dade County is a rapidly growing area, Police and Fire/Rescue expenditures, as in most local governments, are growing at a faster rate. With cost efficiencies in mind, both departments have recently launched strategic planning efforts to more effectively use technology in their daily operations.

This section presents the project background and/or history as follows:

A. Project History
B. Miami-Dade Fire/Rescue Department Overview
C. Miami-Dade Police Department Overview
D. Information Technology Department Overview

Each of these is discussed in greater detail in the following paragraphs.

A. Project History

The Police Department is implementing a comprehensive Information Systems Plan (ISP), which identified computer aided dispatching and field computing as two of the highest priority information technology projects for the Department. However, due to a lack of funding, these projects could not move forward. Recently, MDPD received approval from the Miami-Dade County Manager to implement an MCU pilot project for the Doral District.

The Fire/Rescue Department has a plan which identifies the areas where technology will provide the most productivity improvements. Fire/Rescue records management, computer aided dispatching (CAD), Automatic Vehicle Location System (AVL) and Mobile Computing Units (MCUs) fully integrated to CAD are the highest priority functional areas that would provide the most benefit to the Department.

B. Miami-Dade Fire/Rescue Department Overview

The Miami-Dade Fire/Rescue Department provides comprehensive public safety services, including structural fire suppression, marine fire suppression, emergency medical rescue, aero-medical transport, hazardous materials mitigation, water rescue and recovery, fire prevention, inspections, and investigations. More than 1,462 uniformed and 235 civilian personnel, operating out of 55 stations and offices, using more than 300 vehicles, respond to over 170,000 requests for service each year. Service demand has been increasing at a steady rate of about nine percent for the last five years. It is expected to continue to grow at the same rate for the next five years.

The Director serves as the Fire Chief of Miami-Dade County. Reporting directly to the Director are two Deputy Fire Chiefs and five Assistant Chiefs responsible for the administration and operation of the Department. More detailed organizational charts can be provided on request.

The Deputy Fire Chiefs implement the goals and directives of the Department. They provide management for and direction to all major administrative, operational, support and special service areas within the Department.

Fire/Rescue Department Administrative Services Division supports field personnel with the development and evaluation of administrative procedures, coordination of personnel services, provision of management information, central record keeping, records system management, financial management, preparation and budget review, and coordination of Fire Board and County Commission agenda items. This service area includes the bureaus of Personnel Management, Financial Management, as well as the Fire/Rescue Records Center. The Administrative Services Division, Policy and Procedures Office the Office of Community Services and Public Information Bureau report to the Assistant Director for Administration.

An Assistant Chief is responsible for the Logistical Services Division, the Fire Prevention Division, and Project Development Office. The Logistical Services Division is responsible for much of the Department's physical infrastructure. It is responsible for the management of the Mobile Equipment Bureau, Research and Development Office, and the Supply Bureau. This service area also directs the procurement planning. The Project Development Manager is responsible for planning new facilities, as well as the replacement and maintenance of existing facilities.

An Assistant Chief is responsible for the Communications Division, Management Information Systems Division and Planning Office. The Communications Division's primary responsibility is to dispatch rescue and suppression units based on requests received through the 9-1-1 system. Along with the coordination of all communication functions and the maintenance of emergency contact information, this division also monitors daily information on hydrant availability, burn permits, and trauma activity.

An Assistant Chief is responsible for three Operations Divisions, the Special Operations Division, and the Airport Division. Operations provides direction and supervision of direct emergency services to the public, provides fire and rescue operations at Miami International Airport and Opa Locka Airport, and provides countywide air rescue transport and inter-hospital transport service for both Dade, Broward and Monroe Counties.

An Assistant Chief is responsible for the Emergency Medical Services (EMS) Division, the Training division and the Labor Relations Division. The EMS Division is responsible for the management and development of departmental medical and safety policies. The Training Division is responsible for the development, implementation, and recording of training programs within the Department. This division manages Suppression Training, Rescue Training, Water Rescue Training, and Hazardous Materials Bureaus.

To some degree, every area of the Department will be affected by the technology requested in the CAD RFP. However, those most affected will be Communications, Operations and Emergency Medical Services.

C. Miami-Dade Police Department Overview

The Miami-Dade Police Department provides comprehensive public safety services, including uniformed patrol from nine district stations, as well as, police operations, special patrol and community affairs bureaus, investigative services, which include homicide, narcotics, economic crimes, robbery, sexual crimes, domestic crimes, crime laboratory analysis, crime scene investigations, warrant service, civil process, and property and evidence storage and control, support services which includes police training, communications command and control, records management, and information systems services. Over 3,188 sworn police officers and 1,437 civilian employees, including the Airport District, operating out of 32 locations and other facilities using 2,000 plus vehicles, respond to more than 660,000 requests for service each year.

The Director has the responsibility and authority for the management direction, control of operations, and administration of the Department to provide efficient and effective police service to the citizens of Miami-Dade County. The Director has responsibility and authority to formulate plans and policies, and managerial coordination of all departmental operations, including fiscal management.

The Department is hierarchically organized into three major service areas: Police Services, Investigative Services, and Support Services each headed by an assistant director. Each service is responsible for specific public safety activities. These activities and responsibilities are organized under divisions, each one headed by a chief. Brief descriptions of the services and divisions follow.

Police Services provides centralized and decentralized patrol services to prevent and repress criminal activities, investigate offenses, apprehend offenders, furnish day-to-day law enforcement services to the community, and specialized functions such as crowd control, hostage negotiation, canine, mounted, motorcycle, marine, and underwater recovery. The decentralized patrol functions, such as uniformed patrol, traffic accident investigations, and general investigations, fall under the North and South Operations Divisions and are handled through each of the nine designated districts in unincorporated Miami-Dade County.

Investigative Services provides centralized criminal investigative services concerning homicides, robberies, sexual crimes, domestic crimes, narcotics, vice, organized and economic crimes, crime laboratory analysis, crime scene investigations, warrant service, and property and evidence storage.

Support Services is responsible for planning and research functions, compliance with accreditation standards, and is delegated responsibility and authority to assign and utilize personnel and material to provide departmental information, administrative and technical services concerning records, communications, information systems, fiscal budget and personnel management, and training functions. This service area includes the Information Systems Support Bureau that is responsible for the installation and support of hardware and networks that are controlled and used by the Department.

Also included in this service area, are two of the bureaus responsible for the successful completion of this project: the Systems Development Bureau and the Communications Bureau. The Systems Development Bureau is responsible for the planning and implementation of new automation technologies, and development of software applications to meet departmental needs. The Communications Bureau provides two-way radio, emergency 9-1-1, and alternate response telephone service, and automated data communications in unincorporated Miami-Dade County and designated municipalities.

D. Information Technology Department Overview

The Information Technology Department (ITD) provides information technology services to all of the operating and support departments in Miami-Dade County. The Department is both a control agency, evaluating departmental requests for the acquisition and use of technology, as well as a support agency, providing all of the other County departments software design and development services, hardware operation, network design, GIS infrastructure, installation and operation, and access to numerous departmental and countywide databases.

CAD Working Group Formed

In May 2000, the Miami-Dade County's Chief Information Officer, Mr. B.R. Witt, created the CAD Working Group to look into the functionality, stability and feasibility of continued technology improvements to the existing CAD system.

Mission:

To operate an enhanced computer-aided dispatch (CAD) environment that provides Miami-Dade Police and Fire Rescue Departments with the necessary information needed to more quickly and safely respond to citizens' needs.

The initiative to look at the current technology state of the CAD system resulted from public concerns that our existing system had reached the end of its useful life and that response time improvements could no longer be realized with current technology. The CAD Working Group was formed with members from the Miami-Dade Fire Rescue, Police and Information Technology Departments. The CAD Working Group was tasked with the following goals and objectives:

Goals:

- Identify desired CAD Improvements of each department
- Determine feasibility, costs and benefits of desired improvements
- Identify approach to implement new functionality
  - o Modify and add functionality to the existing system
  - o Replace existing system with off-the-shelf product
  - o A combination of the above processes
- Identify budgetary impacts as well as funding alternatives and recommend funding strategies

Objectives:

- Improve response times
  - o Implement automated silent dispatch
  - o Implement Automated Vehicle Location (AVL)
  - o Implement system status management ("Move-Ups")
- Improve availability of site information
  - o Hazardous materials
  - o Premise information
- Reduce radio traffic (Police & Fire)
  - o Status Messaging

- *Provide Mobile Computing Units*

The CAD Working Group has met regularly from May to September 2000. In July 2000, a technical subcommittee was formed to look at specific technology issues concerning the feasibility of improvements to the existing CAD system and issues sorrounding the implementation of a new system. The technical subcommittee has met three times a week since its inception to expedite the completion of the CAD Working Group report.

CAD Working Group Findings

This section outlines CAD Working Group findings. The findings can be categorized in the following areas:

A. Single Emergency E-9-1-1 and Dispatch Systems

B. Present Response Time

C. Process Overview

D. CAD Evolutionary Process

E. Existing CAD Improvement Feasibility

F. CAD Useful life

G. CAD Neutral Systems

H. Agency, Industry and Consulting Surveys

A. Single Emergency E-9-1-1 and Dispatch Systems

The CAD Working Group's first agenda item at the first meeting was to decide whether Miami-Dade County's Emergency E-9-1-1 and dispatch systems should be a single system or different systems that communicate with each other to deliver the desired service.

Goal:

- o Identify approach to implement new functionality
- o Modify and add functionality to the existing system
- o Replace existing system with off-the-shelf product
- o A combination of the above processes

The CAD Working Group considered the three distinct approaches above. Early on, the possibility existed that the Fire Department and the Police Department could operate under different dispatching systems to meet the requirement of two distinct dispatching approaches.

1. The Fire Rescue Department dispatch approach is to have CAD make the recommendation and automatically dispatch the closest unit to an incident based on Automatic Vehicle Location (AVL) information.
2. The Police Department dispatch approach is to have the police dispatchers make the actual dispatch based on information provided by CAD and a graphical AVL.

The major concern was the complaint module of the CAD, which is the call intake for both Police and Fire Rescue Departments. The CAD Working Group decided that it was in the best interest of Miami-Dade County to have one fully integrated system to handle E-9-1-1 and dispatch functions for both the Fire and Police Departments.

From this point on, only two courses of action were considered:

1. Modify existing CAD to meet the functional requirements of the Fire Rescue and Police Departments.
2. Purchase a new system for both Police and Fire Rescue, while building CAD neutral ancillary systems. These activities would occur in parallel.

B. Present Response Time

Response time is one of the most important performance measures to determine the effectiveness of Fire Rescue and Police delivery of service. The chart below shows present Fire and Police response times.

1999	Complaint Process	Dispatch	Travel	Total Response
Fire	0:36	1:30	6:44	8:50
Medical Rescue	1:05	0:59	5:52	7:56
Other	0:42	1:31	5:58	8:11
Police	0:45	1:19	3:22	5:26

Note: Police response time increased when defibrillator units were fielded in March 1999.
Source: Data Supplied by MDFRD and MDPD.

The response times above clearly indicate that the process to respond to an incident is greater for the Fire Rescue Department than it is for the Police Department. It takes about three minutes longer for Fire Rescue department personnel to reach the scene of an incident than it takes Police Department personnel on Police emergency calls. This difference clearly indicates the different philosophical approaches from Fire and Police to improve dispatch. The Fire Rescue department would like to implement a system where response time is reduced by automating dispatch from the time it leaves Police complaint to the time a unit acknowledges dispatch. The Police Department on the other hand, looks to continue to have dispatchers make the actual dispatch and improve the information they

receive from CAD/AVL to make the appropriate decision. Additionally, the Police Department intends to improve response times with the utilization of MCU's in Police vehicles. The process reengineering that will be implemented with the MCUs will allow police officers to be more productive and reduce the workload of dispatchers, therefore resulting in improved response times.

The Fire Rescue Department's priority is to use technology to reduce response time as much as possible. The Fire Rescue department believes that at least 30 seconds can be reduced in the dispatch process and at least 30 seconds can be reduced in travel with an integrated CAD/AVL that will dispatch the closest unit to an incident instead of using station response areas to assign the closest unit. A one-minute response time reduction can significantly improve survivability rates of patients as well as reduce the amount of property destruction in case of structural fires.

The Police Department's top technology project is MCUs, which can be integrated with the existing CAD system. However, the Police Department has raised the following concerns regarding the existing CAD system:

1. *Useful life of System* – MDPD currently has determined that at least 60 enhancements are needed for the existing CAD system, which could take 2-3 years to implement at a cost of $1,000,000. These software change requests are being worked at this time.

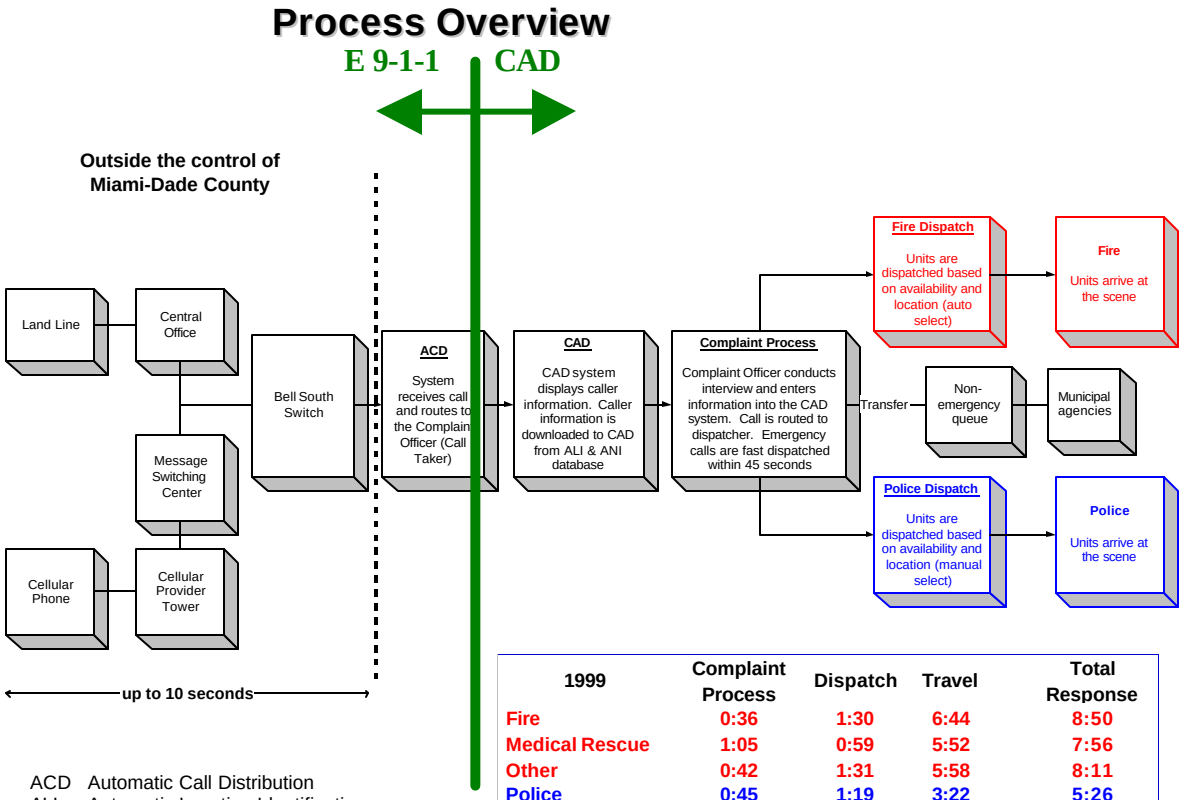
2. *Technical Life of System* – Compaq has informed Miami-Dade County that it may not guarantee support for layered software (the DEC-Forms software) utilized in the existing CAD after January 2005.

3. *Support of CAD* – Currently, there is only one person supporting the Fire CAD and one person supporting the Police Complaint and CAD. The learning curve for new personnel to support the CAD application is approximately one year.

Throughout this document, the two philosophical approaches between Fire and Police dictate whether the existing CAD system is capable of meeting dispatch requirements or whether a new fully integrated system is the best course of action.

C. Process Overview

The dispatch process is a multi-agency process that starts at the time a citizen picks up a telephone and ends by the arrival of Police and/or Fire Rescue personnel to the scene of an incident. The chart below shows this multi agency process.



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Source: Data supplied by MDFRD and MDPD.

ACD Automatic Call Distribution
ALI Automatic Location Identification
ANI Automatic Number Identification
CAD Computer Aided Dispatch

As can be seen above, land lines and/or cellular calls initiate calls to E-9-1-1. Bellsouth brings different communication means together via message switching into the E-9-1-1 phone system. The Automated Call Distributor (ACD) at the Communications Center receives the call and routes it to the Police Complaint Officers. This is where the actual computer aided dispatch (CAD) starts.

The Police Complaint Officer creates an event in CAD and the routes the call to police and/or fire dispatchers for processing. This process takes about forty-five to sixty seconds. The dispatchers then assign the closest unit available based on availability of resources, and an actual unit is dispatched. This process takes a minute to about a minute and a half for police emergency calls. The time it takes the appropriate unit to reach the scene of an incident then ranges from three and a half minutes to six and a half minutes depending on whether the appropriate resource is Police or Fire.

Five to eight minutes response times, for Fire and Police emergency calls respectively, seem to indicate reasonable time frames for dispatch and arrival of resources to an incident when different disparate systems such as voice and data come together and are used throughout the process.

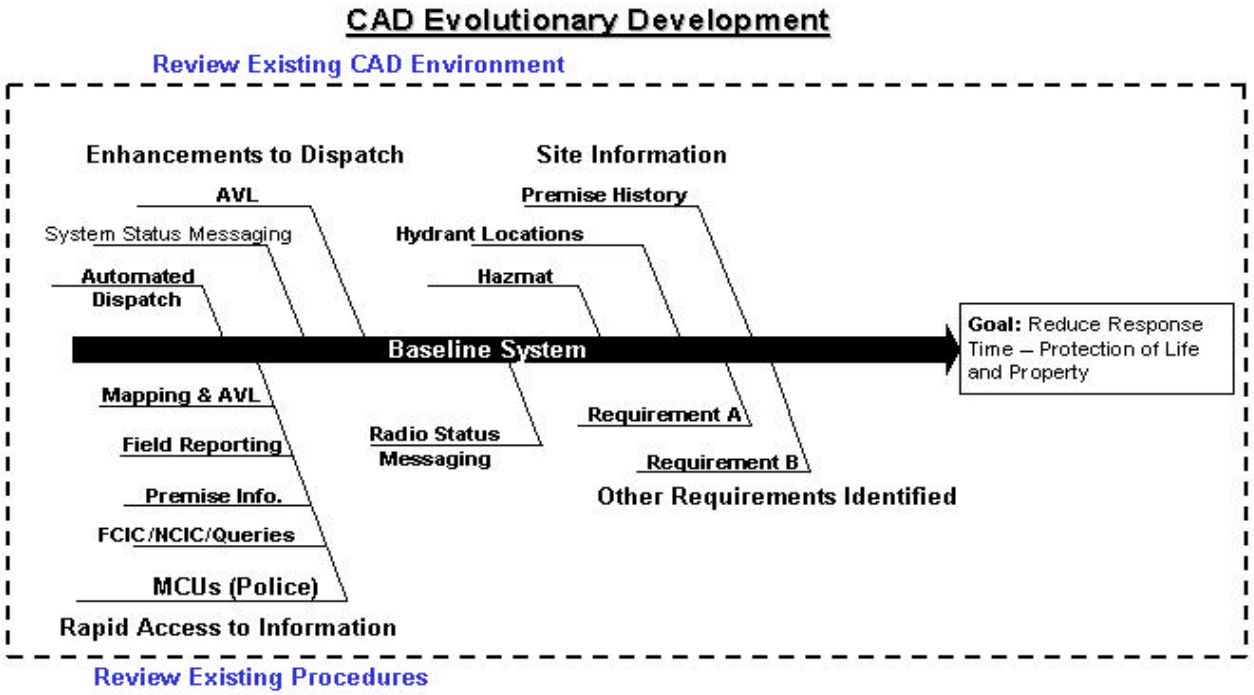
This process model was used by the CAD Working Group to try to identify where the time-savings could be realized or how the business process could be reengineering to meet the demands of a growing community.

D. CAD Evolutionary Process

The CAD Evolutionary Development Model outlines an approach to take the existing CAD system and to continue to enhance peripheral systems to meet the objectives of Fire Rescue and Police Departments. Capabilities may be added in phases in order to improve operations incrementally.

Objectives:

- Improve response times
  - o Implement automated silent dispatch
  - o Implement utomated Vehicle Location (AVL)
  - o Implement system status management ("Move-Ups")
- Improve availability of site information
  - o Hazardous materials
  - o Premise information
- Reduce radio traffic (Police & Fire)
  - o Status Messaging
- Provide Mobile Computing Units



The chart above illustrates a core "baseline" CAD application interfaced to other ancillary systems such as AVL, MCUs, premise history, hydrant locations and hazardous materials information.

The CAD Working Group carefully evaluated the evolutionary development approach for CAD throughout several meetings. It was then determined that a technical subcommittee be established to look at detailed technical issues related to the desired functional improvements to CAD in order to support the evolutionary process.

E. Feasibility of Improving the Existing CAD System

The technical subcommittee was comprised of technical staff of the Police, Fire Rescue and Information Technology Departments. The technical subcommittee developed the matrix below to illustrate feasibility of desired enhancements to the existing CAD.

	Feasible			CAD Functionality		
	Yes	No	Partial	In CAD	Interfaced	External
•Improve Response Time (FIRE)						
–Automated silent dispatch			√	√		
–Automated Vehicle Location		√		√		
–System Status Management ("move-ups")		√		√		
•Improve Availability of site Info. (FIRE)						
–Hazardous materials			√		√	
–Premise Information			√			√
–CAD Premise History			√			√
•Reduce Radio Traffic (FIRE & Police)						
–Status Messaging	√				√	
•Mobile Computing units (MCUs –Police)						
–FCIC/NCIC/Local Queries	√					√
–CAD Queries and Updates – Premise Information	√				√	
–Field Reporting	√					√
–Mapping and Automatic Vehicle Location (AVL)	√					√

As can be seen on the above chart, many of the desired enhancements to the CAD and/or ancillary systems can be partially achieved, or not achieved at all. It should be noted that all the MDPD required MCU functionality could be achieved via the existing CAD utilizing the evolutionary process. The Fire Rescue Department will consider implementation of MCUs after the Police pilot project is completed.

This brings to light again the different philosophies used for dispatch between the Fire Rescue and Police Departments. The desired Fire Rescue enhancements, which would reengineer the Fire dispatch process and improve response time, could not be attained with the existing CAD system.

F. CAD Useful life

The technical subcommittee discussed extensively the useful life of the existing CAD system. The following information was presented to the CAD Working Group.

1. Vendor may not support layered DEC-Forms software utilized by CAD by January 2005.

2. The procurement cycle can significantly impact the implementation; therefore the process must start now to acquire a new CAD.

3. The Information Technology Department recommended replacement by January 2004 for the following reasons:

    a. Resources to maintain DEC-Forms software are difficult to obtain and it is getting increasingly expensive to maintain the existing system.
    b. The learning curve to train personnel on the existing system is excessively long. It is estimated that it takes 12 months for personnel to develop, and effectively support the existing CAD system.
    c. The time ratio to develop a new CAD with enhancements in-house vs. implementing off-the-shelf product with customizations is 13 to 1 (39 person years as opposed to 3).
    ** Note: The source of this information was obtained from Fire Board CAD vendor presentations*

The realization of the findings above clearly indicates the need to replace the existing CAD expeditiously. The CAD Working Group came to the realization that the life of the existing CAD is finite. The CAD Evolutionary Model described in Section D (CAD Evolutionary Process) will be implemented, as is technically feasible.

The CAD Working Group discussed changing the focus from **CAD enhancements** to the development of **CAD Neutral Systems.** CAD neutral systems are neutral to any particular CAD off-the-self software system—that is, those enhancements can be pursued independently, and incorporated into any system the county implements. They will enhance functionality of the existing CAD, but their main objective is to put in place an information delivery system that would feed a new system to meet the requirements of the Police and Fire Rescue Departments.

G. CAD Neutral Systems

CAD neutral systems are systems such as AVL, Hazardous Materials, Hydrant Tracking, Premise History, Premise Information and GIS. These systems are external to CAD but interface to CAD to build a complete information delivery system, which is optimized through CAD to assist in the delivery of Police and Fire Rescue life-safety services.

CAD neutral systems cross departmental, agency, municipal, and/or state and local government boundaries. The CAD Working Group found that the aforementioned systems are largely not in place or that the existing business process is a paper process, which would prove difficult to integrate to the existing or a newly acquired CAD system.

Systems that would directly impact the effectiveness of any newly acquired system designed to meet Police and Fire Rescue requirements are as follows:

1. Fire Rescue station toning and alerting (FIRE)
2. Fire Rescue Hazardous Materials System (FIRE)
3. Hydrant, WASD Information (FIRE)
4. Premise Information (FIRE & POLICE)
5. Site Plans (FIRE)
6. Pertinent GIS Information (FIRE & POLICE)
7. Status Messaging (FIRE)

The Police Department has taken the initiative and obtained the funding to start on a four-phase approach to develop Police specific systems. This initiative, ***e-Police*** will start as a pilot in the Doral District and consists of the following:

1. FCIC/NCIC/Local Queries from Police vehicles
2. CAD Queries and Updates from Police vehicles
3. Automated Field Reporting
4. Mapping and Automatic Vehicle Location.

These systems are critical systems that would send or receive information from a modern CAD system and have proven to improve performance, productivity, and safety of officers and firefighters.

H. Agency, Industry and Consulting Surveys

In an effort to define an industry baseline approach to enhancing/implementing desired functionality in CAD systems, the CAD Working Group looked for external experience on issues that led to the formation of the Working Group.

Mission:

To operate an enhanced computer-aided dispatch (CAD) environment that provides Miami-Dade Police and Fire Rescue Departments with the necessary information needed to more quickly and safely respond to citizens' needs.

Goals:

- Identify desired CAD Improvements of each department
- Determine feasibility, costs and benefits of desired improvements
- Identify approach to implement new functionality
  - o Modify and add functionality to the existing system
  - o Replace existing system with off-the-shelf product
  - o A combination of the above processes
- Identify budgetary impacts as well as funding alternatives and recommend funding strategies

The CAD Working Group:

1. Called other municipalities and inquired into their experience in their approach to modernize their CAD systems
2. With Fire Board assistance hosted presentations by vendors to ascertain functionality of modern CAD systems.
3. Performed searches on www.search.com to look at RFPs issued by other municipalities to evaluate our approach in the possibility of developing a new RFP.
4. With help from the Office of the CIO consulted Gartner to develop an RFP strategy.

The CAD Working Group used information collected in the above steps to formulate recommendations to the Office of the CIO.

Recommendations

The existing CAD system is the most critical Miami-Dade County system. The CAD system handles over 2,000,000 calls a year for emergency and non-emergency assistance from the Fire Rescue and Police Departments. The existing CAD system directly affects life-safety as well as the protection of property for the citizens of Miami-Dade County. The present system was developed in 1979 and went through a complete re-write in 1992. The current system is "not broken" and performs the tasks for which it was intended very well with virtually no downtime and generally performs with a sub-second response time.

The existing system, however, is reaching the end of its useful life. Lack of future maintenance and support for layered software in which the system was written dictates that the process to replace the existing system be started immediately. The CAD system's lack of modern functionality places dispatchers at a disadvantage in dispatching resources to the scenes of incidents.

Through its analysis and evaluation of current CAD systems, the CAD Working Group has come to the realization that modern CAD systems are not only the traditional baseline dispatching system, but have evolved into information delivery systems which assists resources being dispatched to the scenes of incidents. Modern Police and Fire Rescue Departments utilize CAD effectively to:

Modern Information Delivery System:

- Automate dispatching functions by assigning and dispatching units without human intervention.
- Dynamically allocate resources throughout coverage areas according to incidents in progress or based on historical probability and statistics which predict where an incident is most likely to take place.
- Track vehicle movements via global positioning or similarly capable systems.
- Send site and premise information to aid personnel in handling potentially dangerous situations.
- Reduce radio traffic by automating CAD queries, reports and updates.
- Provide multiple levels of support, user groups, and installations of products.

The CAD Working Group recognizes that it is not a sound business approach to continue to enhance the existing system in the long run. Not only because the layered software will

not be supported in the future but because technology is moving at a faster rate than we are able, with scarce resources, to keep up with.

It is because of the reasons mentioned above that the CAD Working Group recommends to the Office of the CIO that it:

1. *Immediately Pursue Procurement of Fire/Police CAD with the goal of implementing the new system by 2004*
    - New CAD Software and Hardware
    - Automatic Vehicle Locator (AVL) fully integrated to CAD
    - Fire Rescue System Status Management
    - Customizations required to interface or integrate existing Miami-Dade County systems into the new CAD
    - Interface with County-Wide Answer Center
2. *Implement one fully integrated CAD system to handle 9-1-1 calls and dispatch functions for both Fire Rescue and Police Departments.*
3. *Immediately determine and commit to multi-year funding strategy for the acquisition of a new CAD. * (Note: These budgetary amounts include monies for Mobile Computing Units {MCUs})*
    - FY 2000/01 $610,000
    - FY 2001/02 $10m
    - FY 2002/03 $4.39m
4. *Look at feasibility of amending the state statute related to the utilization of 9-1-1 fees, to include effective and efficient operations of a CAD center, which should allow for the purchase of a new CAD system and MCUs.*
5. *Implement CAD Improvements consistent with the following objectives:*
    - Implement new functionality on existing CAD to improve Fire Rescue response times in the short term (hard copy printouts at the stations).
    - Immediately begin development of CAD neutral enhancements, such as HAZMAT and premise history databases.
6. *Maintain the CAD Working Group as a Policy and Technical Support Committee*
7. *Look at the feasibility of acquiring a site to house a new communications center for Fire, Police and the Miami-Dade County Answer Center.*

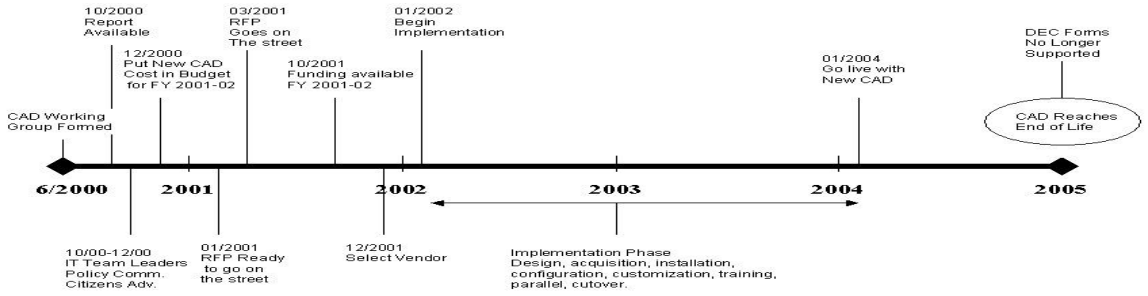
A. Immediately Pursue Procurement of Fire/Police/9-1-1 CAD with the goal of implementing the new system by 2004

The CAD Working Group recommends to the Office of the CIO that the process to acquire and replace the existing Fire/Police/9-1-1 CAD system be started immediately. The CAD Working Group seriously considered an evolutionary process to the replacement of the current CAD system, however, several critical factors dictate that the replacement process be pursued immediately:

***Critical Factors**:*

1. *Support for the layered software in which the existing system was written cannot be guaranteed beyond January 2005.*
2. *Existing support personnel have indicated that they will not be able to implement Fire Rescue Department enhancements affecting improvements in response times with the exception of hardcopy printouts at the Fire Stations.*
3. *MDPD currently has determined that at least 60 enhancements are needed for the existing CAD system, which could take 2-3 years to implement at a cost of $1,000,000.*
4. *Currently, there is only one person supporting the Fire CAD and one person supporting the Police Complaint and CAD. The learning curve for new personnel to support the CAD application is approximately one year. It is a real possibility that the existing CAD system could be left without in-house support for extended periods of time.*
5. *The procurement cycle can significantly impact the acquisition and implementation of a new CAD beyond the time when it is no longer prudent to utilize existing software.*
6. *The Information Technology Department recommends that replacement of the existing system take place by 2004, which is one year before the potential end of support for the current CAD system software (DEC-Forms).*

Below is a tentative schedule for acquisition and implementation of a new CAD system:



B. Implement one fully integrated CAD both Fire Rescue and Police Departments

The Working Group recommends that Miami-Dade County have one fully integrated system to handle E-9-1-1 and dispatch functions for both the Fire and Police Departments.

A single system should address Fire Rescue and Police Departments' different dispatch approaches.

1. The Fire Rescue Department dispatch approach is to have CAD make the recommendation and automatically dispatch the closest unit to an incident based on Automatic Vehicle Location (AVL) information.
2. The Police Department dispatch approach is to have the police dispatchers make the actual dispatch based on information provided by CAD and a graphical AVL.

The major concern influencing this recommendation is the complaint module of the CAD, which is the call intake for both Police and Fire Rescue Departments. Complaint and dispatch systems should not be handled by interfaced disparate systems for the following reasons.

1. Implementation costs are higher because an interface between the two systems has to be developed.

2. Maintenance costs increase as two vendors are responsible for the maintenance and support of the same system.

    a. Two fault tolerant computer systems are needed instead of one. One for complaint and police dispatch and one for Fire Rescue.

    b. Different personnel are needed to support different platforms, operating systems and applications.

    c. Multiple vendor software and hardware contracts are needed to support the two systems.

3. The interface module between complaint and dispatch creates a point of failure between the two systems.

4. Response time could be impacted as a result of delays in transfer of information from one system to another.

5. Process flow improvements become difficult to implement, as modifications may be required in two systems as well as the interface module instead of just one system.

C. Immediately determine and commit to multi-year funding strategy

Over the past 5 months, the CAD Working Group has tried to determine the cost of replacing the existing CAD system. The CAD Working Group contacted multiple agencies, vendors and consultants and surveyed the cost of implementations for a county of our size.

Cost estimates ranged from just about $2,000,000 to over $60,000,000 for projects whose scope ranged below our requirements to projects which went well beyond our requirements. The CAD Working Group weighed the scopes of these projects and estimates that the funding required for the Miami-Dade County project is:

Funding Required

Multiyear Funding Estimates	
• FY 2000/01	$610,000
• FY 2001/02	$10m
• FY 2002/03	$4.39m

The CAD Working Group firmly believes that a multi-year funding mechanism must be put in place prior to the start of the new CAD project.

Potential funding sources for this project are:

- E-9-1-1 surcharge (complaint module only)
- General Fund/Fire Tax District
- Grants
- Law Enforcement Trust Fund

Additionally, pursue the feasibility of amending the state statute related to the utilization of 9-1-1 fees, to include effective and efficient operations of a CAD center, which should allow for the purchase of a new CAD system and MCUs.

D. Amend Florida State Statue governing use of E-9-1-1 Funds

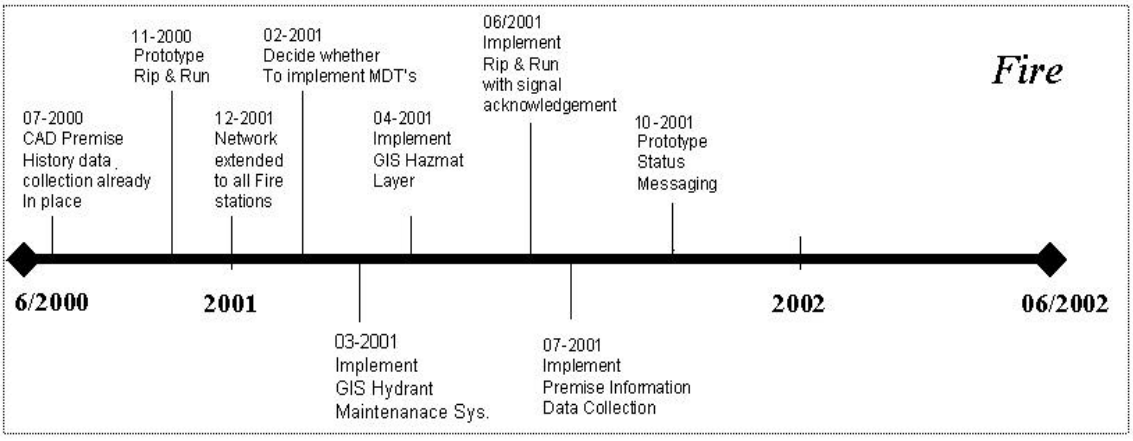
Look at feasibility of amending the state statute related to the utilization of E-9-1-1 fees, to include effective and efficient operations of a CAD center, which should allow for the purchase of a new CAD system and MCUs.

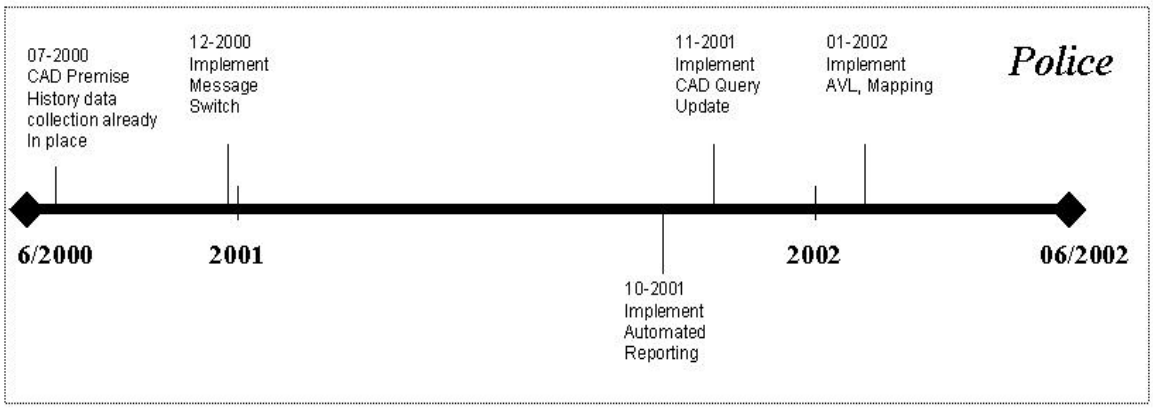
E. Implement CAD Improvements

The CAD Working Group recommends that CAD improvements continue to be made while the county goes through the procurement process for a new system. Improvements, which are attainable and will reduce response time, should be immediately addressed and solved using readily available tools.

Moreover, development of systems, which are CAD neutral and/or enhance CAD functionality, must be immediately addressed. "CAD Neutral Systems" must also be addressed so that systems feeding information to the CAD system are already in place and working at the time the new system is implemented.

The CAD Working Group has identified such systems and has created an implementation timeline over the next two years. The charts below illustrate priority and estimated completion dates.





F. CAD Working Group continues to serve as a Policy and Technical Support Committee

Over the past five months, the CAD Working Group has met regularly to discuss issues associated with the most important system in Miami-Dade County serving the citizens of our community. Lines of communications among the departments involved in the Working Group have opened which have led to better understanding of each other's business process.

The CAD Working Group believes that the lines of communications established on this project should continue in the form of the CAD Working Group.

G. Acquire a site to house a new Communications Center for Fire, Police and the Answer Center.

Miami-Dade County Government should consider the creation of a new Communications Center for emergency and non-emergency Answer Center functions. This should be considered for the following reasons:

1. *Reliability*
2. *Single point expert & helpful support*
3. *Flexibility to affect quick simple changes to accommodate simple requirements*
4. *Stability and focus of service delivery under one umbrella with specific objectives.*
5. *Simplified/unified Operations Management*

6. *Consistency of development to ensure pace is kept with changes in both the computer and telecommunications industries.*